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A Survey on Energy Efficiency of Data Transfering for Mobile-Sink In Wsn

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Abstract: Wireless Sensor Networks (WSN) consists of number of sensor nodes which arranged in the wireless communication for transfer the data to avoid energy consumption. It provides the service to the network user to share the data between the users. With better transfer of data it must contains better energy consumption, and also to avoid the traffics. To achieve this better transferring of data many strategies were designed like mobile sink protocol and some other strategies were developed to transfer data through cluster node in the mobile sink approach. They were concentrated only on the transfer of data problem but failed to concentrate the energy consumption while routing. For this analysis, this survey we analyzed how to consume the energy of the each cluster nodes by electing Mobile Sink Nodes (MSN) in WSN. Mobile Sink is one which has a long-lasting life for transfer data from source to destination node in WSN. For this approach this survey shows the various researchers issues and their benefits.

Keywords: WSN, Energy efficient, Mobile Sink, Cluster node and Data transfer.

I. INTRODUCTION

With the advanced level of wireless network, network has to provide it in an effective manner for transferring the data in Wireless Sensor Networks (WSN). WSN is one of the rising technologies to afford a service to the network users for transferring the data. To transferring the data among the network users, network should provide better communication technique among WSN and should provide efficient energy consumption. In WSN a network has allowed the rapid development for wireless communications. WSN consists of enormous amounts of sensor nodes to make a network for monitoring and transferring the state of process and provide data to the end user. Usually WSN consists of limited devices and also an inexpensive of resources to communicate with each other in the wireless network. Mostly WSN were used for monitoring and transferring the data for military, surveillance, health monitoring, etc. In WSN they were many feasible site are there, it helps to transfer the data from one node to the another with the help of the mobile sink node it transfer the data from source to designation node. In WSN the output is dependent on the relationship between the cluster head on the data collected and the number of members belonging to each sub nodes or sub sinks [1].

To sharing the data in WSN, networks have to afford a superior node for transferring the data between the sinks or nodes. Here the superior node is the one to provide the service between the nodes. It provides the worst factors for providing the service. While transferring the data in the Cluster Nodes (CN), nodes in that CN must have the efficient energy so that it can easily complete their transferring of data between the nodes. With the decreasing level of consumption in WSN communications has concerned increasing attentiveness recently. For this attentiveness they were lot of techniques like distributed data networks (i.e. antennas), multi-hop networks, heterogeneous network, etc. were implemented to overcome the issues. Unfortunately some of the above techniques afford better outputs but it failed in consumption energy for the multiple data transfers in WSN. In recent times, node mobility has become a significant research topic in WSN for energy conservation [1, 2]. In the trajectory of Mobile sink it is random one to assemble information of consequence sensed by the sensor nodes. By assembling successful data by unbearable less energy can progress the network performance. By using fixed path transferring of node can improved the energy efficiency in single-hop but not in multi-hop. With the limited path transfer of data may cause the communication problem to transfer the data. In recently energy consumption is one of the most vital factors in mobile sink nodes. By default, energy consumption consists of sensing, processing and transmitting the data. For the communication process it take more time when compared to the processing the data. Unbalance energy problem were occurred during the transfer of data because of the battery power reducing and also unused battery power.]

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With the sudden occurrence of battery power for the sending data in sensor-to-sink paths, so they have heavier message transmit loads and also it consume more energy. For these issues this survey analyzes the various energy efficient algorithms benefits and their drawbacks [2].

II. LITERATURE REVIEW

In WSN energy consumption were occurred because of gathering of data. For this consumption this section shows the various author's researchers techniques and the benefits and drawbacks of their research article, it helps to overcome the drawbacks of many existing one. Many ideas were introduced for conserving the energy in WSN. Some provide better performance and some proved not satisfying the transfer of data because of loss of data. This survey is going to provide a comprehensive study of various researchers' approaches and their limitations for solving efficient energy conservation problems.

Due to this issues Chen, Yuequan et al [3] study the problem of WSN in the way of multipath routing technique and proposed a MRMS (Multipath Routing in large scale sensor networks with Multiple Sink nodes) were used in multiple sink nodes. It is the dynamic path method of selection for progressing energy efficiency issues. It was provide the distributed energy for distributing the energy in sensor networks to stable the node energy to recover the routing of data transfer mechanisms. With the distributing energy through node in the cluster group, here every node has the lifetime energy by these approaches. But it failed in multipath mechanism for multi sink nodes.

For the WSN issue Rahmaan K and Narendran M [4] were proposed a MobiCluster (MC) algorithm to increasing the attainment for successful data transfer between the nodes and permitting the network with less energy conservation. In this MC data are gathered from all sensor nodes for restriction of energy conservations in WSN. This technique addressed by utilizing the Mobile Sinks to gather the data from remote sensor area and broaden the lifetime of RN (Rendezvous Node) which lie within the cluster nodes and deliver the data to the designation node. This solves the energy conservation problem, reduces communication costs and preventing the data losses.

Xing, Guoliang, et al [5] analysis the problem of data are delivered to the base station before their deadline, hence Mobile Elements (ME) can't sense the data for transfer of the data to the Rendezvous Point (RP) i.e. next nodes and communication problem may arise. The Mobile Elements progress may experience interrupted due to mechanic problems of motion nodes. Furthermore network may endure from communication delays due to congestion or node/link failures. As a result, data may miss its deadline, or the ME and data may miss each other at RPs.

S.Sujitha and G.Mohan [6] studied the WSN problems and proposed an efficient Multi-sink clustering based weighted rendezvous planning method (EE-MSCWRP), it performs the multiple mobile sink nodes in the wireless network. It used different networks to analyze the consumption of energy. By using different network it can easily consume the energy in their approach. In multi sink the synchronization of the multiple users should be adapt to construct the connection to every nodes in various time slots. By this method they were used to achieve this procedure in different methods to solving this problem, i.e. *Node election Mechanism*, used to select the longtime life node in the cluster group for transferring the data through cluster nodes.

H.W. Rabiner et al [7] analyzed different approaches and proposed a classic clustering algorithm related on Low-Energy Adaptive Clustering Hierarchy (LEACH) for WSNs. This is based on the cluster protocol used for unsystematic rotation of the local network of the cluster heads to equivalently to share the energy balanced between the sensors in the network. With the help of this LEACH, it decreases the communication energy for sharing the data. However it has prolonged lifetime network and static clustering algorithms. With this method data are collected from the parallel nodes and then it transfers to the sink node in WSN. However in other way their approach have some drawbacks; for the transmission of data they were no assurance about the total no. of cluster head nodes, here in the network if one cluster node fails means other nodes were unable to transfer the data to the next nodes.

For WSN issues Mohini Kumrawat and Manoj Dhawan [8], proposed a Rendezvous based mechanism for exploiting Mobile Element (ME) to gather the data under material constrains. Here researchers were present two algorithms which are RP-CP and RP-UG it is used for analyzing the constrained and not constrained path for transmissions of data for mobile element and the RP (Rendezvous Points).This approach shows the result in reduce energy consumption and well scaled network density and speedup the networks.

Wang, Jin, et al [9]. studied the problem of inefficient communication, reducing the network lifetime, etc because of weighted rendezvous planning (WRP)

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algorithm. It achieve only for single mobile sink data transfer mechanism and it does not concentrate on multi mobile sink mechanism so they where problem may occur for the energy conservation mechanism and losses of energy due to without sharing of mobile host hence WSN are not frequently visited at any networks. And also if any interference detected in the node then it should not alternate the channel. Then losses of packet or data may occur.

Feng, Daquan, et al. [10] analyze the problem of WSN collusion problem due to the concurrent transmission of data from rendezvous node (RN). By collusion in network they were delay of transferring the data occurred. And some of data were disrupt in WSN transmission. Because of disruption some of the data may eliminate. They were losses of data occurred due to occurrence of disruption problem. And also in some case RN work out of energy hence battery power became low due to fighting with these problems.

Singh, Shio Kumar [11], studied the prolonging lifetime problem of with the increasing no .of data transfer in networks. To discovering the topology and maintaining the cluster head and switching the path are the most important one in networks. By re-selecting the path in the multiple mobile element it can avoid the traffic while transmission of the data. Then the data can send in traffic-less path to reach in the required time. If the data are send in the primary path can dissipated at any time because it consume more energy, and if it want to re-select the path is difficult one to choose the alternative path. This can increases the energy consumption problems in WSN.

III. ACHIEVING ENERGY CONSERVATION USING MULTIPLE MOBILE SINK IN WSN

Recently Wireless Sensor Networks (WSN) is one of the growing technologies to afford a service to the network users. WSN is used to sharing the data among the network nodes. WSN is one of the vital one to share the data with the huge number of sensor nodes to organize in a field. In WSN they were two levels of hop single-hop and multi-hop. In the single-hop, the transfers of data are done only for small area with the limited number of nodes. But in multi-hop, transfer is risky because nodes that are near to each other so they become congested and it have the responsible for transferring the data to the end user [8, 9]. For this crammed problem mobile node energy may reduce due to the jamming of the data. By reducing the energy consumption and preventing the data from congested one is the risky factor and also forward the data from congested one to the end user is one of the major issues through Rendezvous Point (RP) in Multi Mobile Sink Mechanisms (MMSM). To address this energy consumption problem, network node have to select the better cluster head to transfer the data by sharing the energy between the nodes, and network afford a better communication among the cluster nodes and also choose the long lasting battery for mobility nodes to transfer data among RP. For the effective transmission of data the network must contain the following things to provide better transmission

a. Balance factor (BF)

In network they were many node sent the data at the same time so they were occur the traffic and they become a congestion among the node and no data were send properly so here we use BF to balance the traffic in the network. By using this BF we measure the balance factor of traffic load of sensor nodes. BF is consuming to examine how well the traffic load is balanced diagonally sensor nodes [2]. Let Li be the traffic load of a sensor node i. BF with the n number of nodes is distinct as Equation as

$$BF = \frac{\left(\sum_{n}^{i=1} L_i\right)^2}{n \sum_{n}^{i=1} L_i^2}$$

b. Low power consumption

However the sensor nodes are powered by battery and it is frequently very complicated or yet unfeasible to charge or recharge their batteries, it is crucial to diminish the power consumption of sensor nodes so that the lifetime of the sensor nodes, as well as the entire network is extended [2, 12].

c. Network lifetime

Network lifetime can be defined variously according to a type of applications. we define the network lifetime in two ways: (a) the time from network exploitation to the moment when one of any sensor nodes dies, represented by LT1, and (b) the time from network exploitation to the moment when P percentage of sensor nodes. The network traffic is more evenly distributed as the least-loaded path is favored to use. Nevertheless, a decrease in network lifetime (LT1) is unavoidable since only the cumulative path load is not enough information to identify the path including the most overloaded node. Consequently, there exists a trade-off among the even distribution of traffic load and network lifetime [13].

d. Cluster communication

Cluster communication is one of the important one among the cluster nodes. Here the communication is the process

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of transferring the data among the nodes. In network, one node transfer the data to another node means that node is the responsible one to transfer that data to the end node. Transferring of data among the cluster network is the cluster communication [7]. Through this cluster communication the data are travelled among the node so energy of every node will be prevent by sharing the energy between the cluster networks.

e. Cluster head selection

Transfers of the data are done through selection of node in a network and choose the cluster head which have the long lasting life to transfer the data. Cluster head selection should be based on node density, bandwidth of the node, long-lasting energy, communication cost and so on. The network lifetime should be evaluated by the mobile nodes. The cluster of nodes should be elects the cluster head and the cluster head maintains the Report about the nodes in the topology, so it can reduces the energy conservation problem and every node in a cluster have an equal energy no losses of energy will occurred. The Cluster Head should be varied from hop of the nodes.

f. Sink Mobility Pattern

Sink mobility task is to moving and collecting the data from every node [3]. Sink mobility become an important research topic in WSN. Mobile sink path is used to collect the information or data from the sensor nodes. Collecting of effective data through sink mobility can consume low energy and improve the network performances. Fixed path of sink mobility can progress the energy for single-hop network, because it have limited path to communicate and in multi-hop network they were more node which is used to transfer the data, by using fixed path in multi-hop method can solve the energy problem using shortest path finding and it is easy to choose the cluster head and consume low energy for collecting data. While transferring the data in networks data may transfer.

g. Multiple Mobile Elements

In WSN Mobile Elements (ME) travel across the network and obtain the data from the every node or from the cluster node. It travel and collect the data from every RP which is said to be rendezvous point. In network for saving the energy of the every node we use this method. By providing single ME it is not fare one to fetch the data across the networks. With the help of Multiple ME can solve the time consuming problem and send the data within a deadline. In the large network, transfer of data using MME can prevent the deadline expiration problem. The ME collects data only from allocated set of sensor nodes. By providing this technique then the battery power will maintained for the every node in the networks [3, 14]. Providing MME in the network can improve the battery power of every sensor nodes.

IV. OUTCOMES OF SURVEY

- In this survey, we have analyzed the WSN issues while transferring the data between the nodes.
- For this survey we have studied the various researchers' approaches for the energy efficient problem for transferring the data between the cluster nodes.
- Transfer of data energy consumption is one of the essential one in the WSN.
- In WSN data are transferred among the cluster nodes with the help of the cluster head, to communicate with other node
- By selecting the cluster head in a cluster node it can effectively overcome the losses of data, collusion and energy problem.
- Cluster head is one which has the long lasting life to transfer the data among the nodes and maintains the report about the nodes.
- Transfer of data can be easier one in the single-hop network, but in multi-hop it difficult to transfer the data with the large no .of nodes.
- By using this cluster approaches data can send easily and energy of nodes also maintain at the same level.
- In this survey with the help of cluster head helps to achieving the minimizing and balancing the energy consumption problem by using the MME (Multiple Mobile Element) for the RP and maximized the lifetime of network for transferring the data.

V. CONCLUSION

In this survey, we have presented an overview of efficient energy consumption for data transfer among the mobile sinks and also we present an overview of energy consumption problem in WSN while transferring the data among the sink nodes. WSN is the only way to transfer the data among the nodes without wired connection, with the progressing technologies of wireless network, providing the efficient transfer of data is one of the essential one. While transferring the data, WSN meets many problems due to battery power reducing. For this issue we analyze many approaches and various research articles finally we provide this survey to show the effective communication of data transfer between the nodes. From our best of knowledge MME provide the better communication technique and also we having long-lasting life for data transfer it solves the issue of energy consumption. In this survey we have presented many research articles and various techniques to provide better transfer of data.

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